

# *Computers*

---

## **&** ELECTRICAL ENGINEERING

List of Contents, Author and Key Word Index

Volume 19, 1993



PERGAMON PRESS

OXFORD • NEW YORK • SEOUL • TOKYO

---

# Computers & Electrical Engineering

*An International Journal*

---

## editor

**Mo Jamshidi**

AT&T Professor and Director  
CAD Laboratory for Systems and Robotics  
Department of EECE, University of New Mexico  
Albuquerque, NM 87131, U.S.A.  
*Tel:* (505) 277-5538, *Fax:* (505) 277-1439  
*E-Mail:* jamshid@houdini.unm.edu

## founding editor

**John B. Slaughter**

President, Occidental College  
Los Angeles, CA 90041, U.S.A.

---

## editorial advisory board 1993-94

**P. Faurre** Paris, France  
**A. E. Karbowiak** N.S.W., Australia  
**N. A. Kheir** Rochester, Mich., U.S.A.  
**M. Mansour** Zurich, Switzerland  
**J. S. Meditch** Seattle, Wash., U.S.A.  
**J. L. Melsa** Lisle, Ill., U.S.A.

**D. A. Pierre** Bozeman, Mont., U.S.A.  
**F. Reza** Ottawa, Canada  
**J. R. Rowland** Lawrence, Kan., U.S.A.  
**A. P. Sage** Fairfax, Va, U.S.A.  
**H. W. Sorenson** La Jolla, Calif., U.S.A.  
**L. A. Zadeh** Berkeley, Calif., U.S.A.

---

## board of associate editors

**A. I. Abdullah** Al-Ain, UAE  
**M. Ahmadi** Windsor, Ont., Canada  
**M. Aldeen** Melbourne, Australia  
**F. Aminzadeh** Brea, Calif., U.S.A.  
**R. L. Carroll** Washington, D.C., U.S.A.  
**S. Erfani** Middletown, N.J., U.S.A.  
**M. Etezadi** Reno, Nev., U.S.A.  
**D. M. Etter** Boulder, Colo., U.S.A.

**K. Furuta** Tokyo, Japan  
**M. Gupta** Saskatchewan, Alb., Canada  
**H. A. Kalhor** New Paltz, N.Y., U.S.A.  
**R. Lumia** Gaithersburg, Md, U.S.A.  
**M. Malek** Middletown, N.J., U.S.A.  
**C. C. Nguyen** Washington, D.C., U.S.A.  
**R. V. Patel** Montreal, Que., Canada  
**M. Roggemann** Kirtland AFB, N.M., U.S.A.

These Boards are being expanded to include representatives from various areas of computers and electrical engineering.

---

### Publishing Office

Pergamon Press Ltd, Pergamon House, Bampfylde Street, Exeter EX1 2AH, England [*Tel.* Exeter (0392) 51558; *Fax* (0392) 425370].

### Publishing Editor

Alison Seedhouse

### Advertising and Subscription Offices

Enquiries from customers in North America should be sent to: Pergamon Press Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A., and from the remainder of the world to: Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, England.

### Subscription Rates

Annual Institutional Subscription Rates 1994: North, Central and South America, US\$570.00, Rest of World, £370.00. Associated Personal Subscription Rates are available on request for those whose institutions are library subscribers. Sterling prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance and are subject to change without notice.

### Back Issues

Back issues of all previously published volumes, in both hard copy and on microform are available direct from Pergamon Press offices.

Published 6 issues/annum in January, March, May, July, September and November.

Copyright © 1994 · Pergamon Press Ltd

Second class postage paid at RAHWAY NJ. Postmaster send address corrections to *Computers & Electrical Engineering*, c/o Pergamon Press Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

---

## LIST OF CONTENTS

### NUMBER 1

<b>Saad Haj Bakry, Ahmad El-Afandi and Adnan Nouh</b>	1 A computer package for the capacity assignment of computer networks
<b>B. E. Stuckman and P. L. Stuckman</b>	9 Finding the "best" optimal control using global search
<b>Faisal Fadul and Karl Weidenboerner</b>	19 Microcomputer interface board based multiple over- current relays
<b>G. A. Armstrong and M. L. Simpson</b>	25 Designing a custom VLSI moment invariant data signal processor
<b>Yakov Z. Tsyppkin and Eduard D. Aved'yan</b>	41 Optimal off-line signal processing
<b>A. H. Bamani, M. M. Wali and M. S. Fadali</b>	47 Model reduction in the presence of small time delay
<b>Hidekiyo Itakura and Toshihiro Furukawa</b>	55 An echo canceller with a block-implemented learning identification algorithm
	I Software Survey Section: SACALC—Signal Analysis Calculator

### NUMBER 2

## Artificial Intelligence in Engineering Design and Manufacturing

<b>Mo Jamshidi</b>	v Editorial
<b>Hamid R. Parsaei and Andrew Kusiak</b>	vii Guest Editorial
<b>F. Archetti and A. Sciomachen</b>	65 Transient behaviour and parametric sensitivity in failure prone systems
<b>J. Bowen, D. Bahler and A. Dholakia</b>	73 An AI constraint network-based approach to bed-of-nails DFT for digital circuit design
<b>Zhen-Ping Lo and Behnam Bavarian</b>	87 Multiple job scheduling with artificial neural networks
<b>Mark D. Pardue</b>	103 Use of cooperating expert systems for real-time fault detection and correction in a manufacturing cell
<b>Ezat T. Sanii and Jong-Shin Liao</b>	113 An expert process planning system for electronics PCB assembly

<b>T.-H. Hou and L. Lin</b>	129	Manufacturing process monitoring using neural networks
<b>Michel Pelletier and Laeque K. Daneshmend</b>	143	Paradigm for compliant motion control in environments with unknown or variable dynamics
<b>Surendra M. Gupta and Louis Brennan</b>	157	A knowledge based system for combined just-in-time and material requirements planning
<b>S. M. Alexander, C. M. Vaidya and J. H. Graham</b>	175	Model for the diagnosis of CIM equipment

### NUMBER 3

<b>M. S. Obaidat and Dirar S. Abu-Saymeh</b>	185	Performance of RISC-based multiprocessors
<b>Maki K. Habib</b>	193	Efficient and fast algorithm to generate minimal Reed-Muller exclusive-OR expansions with mixed polarity for completely and incompletely specified functions and its computer implementation
<b>R. Colbaugh and K. Glass</b>	213	Hierarchical control of human joint motion simulators
<b>Hassan Peyravi, Kazim Khan and Paul A. Farrell</b>	231	Limiting distribution of the blocking probability for circuit-switched networks
<b>Hassan M. Razavi</b>	245	NMOS realization of digital circuits with digital summation threshold gates
<b>Sabry M. M. Ibrahim</b>	251	Pattern synthesis of circular array

### I Software Survey Section

### NUMBER 4

## Neural Networks and Fuzzy Logic: Theory and Applications in Robotics and Manufacturing

<b>Mo Jamshidi</b>	v	Editorial
<b>J. Yuh</b>	255	A multilayered neural net controller using direct learning algorithm
<b>Zheng Geng and Leonard S. Haynes</b>	265	Dynamic control of a parallel link manipulator using a CMAC neural network
<b>Farzad Pourboghra</b>	277	Adaptive neural controller design for robots
<b>M. Jamshidi, D. Barak, S. Baugh and N. Vadiie</b>	289	Computational and experimental environments for fuzzy logic and control
<b>R. M. Inigo, G. S. Himes and C. Narathong</b>	299	A neural network visual-tracking system

- |  |     |  |
|--|-----|--|
| <b>Thomas Martinetz and<br/>Klaus Schulten</b>       | 315 | A neural network for robot control: cooperation between neural units as a requirement for learning |
| <b>Don Hush, Chaouki Abdallah<br/>and Bill Horne</b> | 333 | The recursive neural network and its applications in control theory                                |

#### NUMBER 5

- |   |     |   |
|---|-----|---|
| <b>M. Aldeen and F. Crusca</b>                                      | 343 | Toolkit for large-scale systems controller design in the frequency-domain     |
| <b>Connie Bowen and<br/>Nader Bagherzadeh</b>                       | 351 | Image processing applications in C++ on a hypercube multicomputer             |
| <b>Suranjan Ghose, Bhabani P. Sinha<br/>and Jayasree Dattagupta</b> | 365 | An extensible fault-tolerant network architecture                             |
| <b>Tirumale Ramesh and<br/>Subramaniam Ganesan</b>                  | 377 | Reconfigurable shared and dedicated-bus multiprocessor for parallel computing |
| <b>Q. Ta and J. S. Meditch</b>                                      | 387 | A high-speed integrated services switch based on 4 x 4 switching elements     |
| <b>Corrigendum</b>  | 399 |   |

- I Software Survey Section: DCSP; ARP-Petri Nets Analysis and Simulation System; MAFIELD: 3-D Electromagnetic Field Calculations; DSPE: Digital Signal Processing; VISION: Digital Image Processing/Educational package; MAGNUM: Finite Element Field Computations

#### NUMBER 6

### Parallel and Distributed Computing for Intelligent Systems

- |  |     |   |
|--|-----|---|
| <b>Nageswara S. V. Rao,<br/>Sandeep Gulati,<br/>S. Sitharama Iyengar and<br/>Rabinder N. Madan</b> | v   | Guest Editorial   |
| <b>Michail Zak</b>   | 401 | Irreversibility and creativity in neurodynamics   |
| <b>Abdou Youssef</b>   | 419 | Randomized self-routing algorithms for Clos networks                                    |
| <b>L. M. Patnaik and<br/>J. Mohan Kumar</b>  | 431 | Distributed memory systems for simulating artificial neural networks                    |
| <b>N. S. V. Rao, S. S. Iyengar and<br/>R. L. Kashyap</b>   | 445 | Computational complexity of distributed detection problems with information constraints |
| <b>Raoul Tawel</b>   | 453 | Learning in analog neural network hardware  |
| <b>Nikzad Toomarian</b>  | 469 | Multi-target tracking in dense threat environments                                      |

<b>S. T. Venkataraman and S. Hayati</b>	481	Shared/traded control of telerobots under time delay
<b>C. R. M. Sundaram and Y. Narahari</b>	495	Modelling and analysis of the variance in parallelism in parallel computations
<b>J. Barhen and S. Gulati</b>	507	"Chaotic relaxation" in concurrently asynchronous neural networks

